

**Responds to Anonymous Referee #1 comments for
“Technical note: Surface fields for global environmental modelling” by Choulga et al.**

Dear Anonymous Referee #1,

General comments

The authors reported the development of a set of boundary conditions for the global LISFLOOD model at the 3 arc minutes of spatial resolution. The authors’ tremendous efforts to develop such high-resolution global data should be well praised. The manuscript is well-written, and I don’t have much specific comments.

Thank you for the positive evaluation.

My only concern is whether the manuscript fits the technical note of a hydrology-specific journal (HESS). My honest impression is that the manuscript is too specific and looks like a manual of a model. I never intend to depreciate the value of technical documents, but such documents are generally too hard to read for people who haven’t been deeply involved in that specific model. My assessments of individual chapters are detailed as follows. Chapter 2 explains the boundary condition of the LISFLOOD model, which is highly model-specific. Chapter 3 lists the datasets chosen by the authors. Many of them are well-known and widely used. It provides neither a general review of available datasets nor the know-how of dataset selection. Chapter 4 explains how the chosen datasets have been converted into the input-ready format of LISFLOOD. Unfortunately, this part is hard to read because most procedure descriptions are squeezed into tables. The text might be informative for LISFLOOD users but too concise to read for non-users. Chapter 5 is short, just specifying metadata. Hence, I skip commenting. Chapter 6 discusses the importance of boundary condition data preparation, but it is not mainly on the data preparation itself but largely refers to the entire operation of the LISFLOOD simulation system. My naïve suggestion is that the manuscript better fits with more data or protocol-oriented papers (e.g. ESSD or GMD). Ideally, it is better to be published as a freely available manual or document of LISFLOOD. If the authors wish this paper to be published in HESS, I recommend further emphasizing the general and applicable wisdom to generate a high-resolution global dataset. Perhaps my assessment above might be useful for revision.

We agree that the manuscript was compact and contained some repetitions, with the structure that could be improved as also suggested by Reviewer 2. We have totally re-organised the sections, now organised by surface field category, and have moved the description of the source dataset description to an appendix. Finally, for each surface field category we have highlighted possible uses beyond hydrological modelling and provided regional examples of the CEMS_SurfaceFields_2022 dataset.

Specific comments

- Line 105 “The main model’s technical field is ‘mask’”: This part is a bit difficult to read. What do you mean by “technical field”? **Here we meant that this field is used only by LISFLOOD model, and has little interest for other applications. The sentence was rephrased.**
- Line 514 “Surface field creation overview”: I think this subsection should be moved to the next chapter. **We have fully rearranged the manuscript as suggested also by the other reviewer.**
- Line 562: The figure number is missing. **Corrected.**
- Line 570 Table 3: I believe that the authors are mainly explaining the procedures (the row of transformation). Unfortunately, it is hard to read because the sentences are incomplete. Also, some fields seem totally irrelevant to non-LISFLOOD -users (e.g., standard deviation of elevation). **We have rearranged the manuscript and added examples of alternative use for each field category.**
- Line 721 Conclusions: The part is interesting, but it discusses, for example, “simulating long periods (Line 738)”, “better modeling (Line 752),” and others. The description of the model and simulation is indispensable in interpreting this part. **We have added information on alternative use and enhanced some of the descriptions.**
- Lines 786- 793: Is this part really needed? **Adapted and rephrased.**